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Nursing Labor Costs 82

RELATING NURSING CARE REQUIREMENTS
TO
DIAGNOSIS RELATED GROUPS (DRGs)

A Graduate Management Project Proposal

Submitted to the Faculty of

Baylor University

in Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

by

Major Holly A. Slater, USAF, NC

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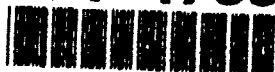
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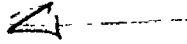## Abstract

The implementation of the prospective payment

system (PPS) to reimburse medical treatment facilities

(MTFs) for care provided had a definite impact on

healthcare facilities. According to the PPS, payments

to healthcare facilities include coverage for all

aspects of the provision of health care, including the

care provided by nurses. With the costs of nursing

labor continually rising, healthcare executives must

become familiar with the costs of provide nursing care

to patients.

Birch & Davis (1990) conducted a study of nursing

care hours required for 80 percent of cases treated in

U.S. Army MTFs. The noted a strong correlation, with

the exception of four DRGs, between total nursing care

hours and acuity among the top 114 DRGs.

This study will analyze the nursing care hours

required for DRGs 138 and 139 at Wilford Hall USAF

Medical Center (WHMC) and compare the results with

those found in the Birch and Davis study. Analysis

will be performed at both the diagnosis and the DRG

level. Any variations in nursing care hours, if found,

are expected to be at the diagnosis level. Variations

in nursing care hours at the diagnosis level could be

indicative of heterogeneity within the DRG.

Introduction

Background

The development of the diagnosis related groups (DRGs) system of categorizing patients on the basis of resource consumption and the implementation of the prospective payment system (PPS) has introduced a level of competitiveness into the healthcare environment never before seen. Hospital payments under the PPS are based on the average resource use of patients in each DRG. Adjustments are made for indirect teaching expenses, hospital location, and the share of low-income patients treated. Despite these adjustments, many healthcare executives are concerned about the ability of the system (DRG) to account for the differences in the cost of care (McNeil, Kominski, & Williams-Ashman, 1988).

Since implementation of the PPS, dramatic changes have been seen in admissions, lengths of stay (LOS), acuity of the patients, and locales of treatment. In 1987, four years after implementation of PPS and utilization of DRGs, admissions declined by 11 percent and patient acuity increased (McGovern & Newbern, 1988; Hickey, 1987).

During the past two decades, professional nursing executives made progress in identifying relationships between inputs (nursing hours) and outputs (DRGs or patient discharges). Various methods have been developed to determine the amount and intensity of nursing care required for each patient, to associate costs with the identified nursing care needs, and to identify proportions of room charges which can be attributed to the direct and indirect costs of nursing care (McCloskey, 1989; Meeting, Saunders, & Curcio, 1988; O'Connor, 1988; Staley & Luciano, 1984).

Since the use of DRGs by the Medicare PPS is based on the assumption that resource consumption is fairly uniform within specific DRGs, it seems reasonable to assume that use of nursing personnel to provide the care is also similar within specific DRGs. Unfortunately, the latter assumption is incorrect as several research studies reveal that many DRGs contain patients with varying (heterogenous) patterns of nursing resource consumption (Bost & Lawler, 1989; Reschak, Biordi, Holm, & Santucci, 1987).

The existence of heterogeneity within DRGs makes the makes utilization of a DRG case mix history difficult to use as a predictor of future resource requirements. The two primary sources of heterogeneity

within DRGs appear to be variances in resource consumption and severity of illness. The two factors cannot be separated when considering the provision of nursing care. DRGs exhibit substantial variations in resource use as a result of varying severity of illness and the requirement to provide higher levels of nursing care (Green, McClure, Wintfeld, Birdsall, & Rieder, 1987). Because of the probability of a variance in the use of nursing care for individual cases, it is necessary to identify and refine heterogenous DRGs. This can be done through close examination of nursing care time expended for specific groups of patients, at the diagnosis or DRG level.

In 1990, Congress requested that the Department of Defense (DoD) conduct a study to assess the feasibility of using DRGs to predict nursing resources for military MTFs. The study assessed relationships between the Workload Management System for Nursing (WMSN) patient acuity system and DRGs. In general, findings showed that nursing care hours varied considerably among different DRGs, but were fairly well clustered within DRGs. A few DRGs demonstrated variances in nursing care requirements which could complicate the use of a DRG case mix as a predictor of staffing requirements (Birch & Davis, 1990).

Statement of the Problem

Proven methods which accurately and consistently associate nursing care requirements with specific classes of patients do not exist.

Literature Review

In 1983, Public Law 98-21, the Social Security Amendments of 1983, established a prospective payment system (PPS) based on the DRG categories. This payment system established prices for specific groups of hospitalization cases based upon categories of illness (DRGs) and enabled the federal government to implement a method of paying hospitals in an organized, equitable manner for care expected to be rendered to Medicare beneficiaries in the future (Griffith, 1987). The DRG system is based on a medical model which uses medical diagnosis classification of patients as the case-mix measure. Although the costs of nursing care are included in the computations, the pricing system does not incorporate methods of determining how much nursing care is required for each type of patient nor does it separate nursing resource consumption from other resource consumption (Cromwell & Price, 1988; Shaffer, 1988).

The changing economic incentives in the healthcare industry led to budget decentralization and the increasing tendency to place responsibility for allocated fund utilization at the department level. The shift in responsibility resulted in a greater number of nursing departments required to identify the costs of providing nursing care as a component of the patient's overall bill (Rosenbaum, Willert, Kelly, Grey, & McDonald, 1988). In order to determine the actual costs of providing nursing care, managers must use proven methods to determine the quantity of nursing care required for each patient's hospitalization and then appropriately associate that information with specific patients or groups of patients.

Awareness and utilization of management and cost accounting practices noticeably increased with the advent of the DRG payment system. The Health Care Financial Management Association reported that only 54 percent of the hospitals could determine their costs by DRG. The report also revealed that few of the facilities could associate costs with specific procedures (Eastaugh, 1987). There are many reasons why facilities would want to extend the costing of nursing services into DRGs. Determining how much nursing care is required for specific DRGs would help

nursing managers (a) determine what portion of the DRG cost is attributable to the nursing care provided for each patient, (b) compare the facility norms with other similar facilities, and (c) set standards for nursing care and staffing patterns. Hospital and nursing managers could also use the results to develop labor usage guidelines (standards) and identify trends for the facility's largest, most expensive cost center (nursing) (Thompson & Dier, 1988).

The most apparent reason for separating nursing labor costs from the traditional hospital room and board charges was the implementation of the DRG prospective payment system (Barhyte & Glandon, 1988). Some facility administrators and nursing service managers contend that the cost of providing nursing care is already known. This may be somewhat true if you simply divide the nursing department total costs by the number of patient days of care provided to obtain a per diem figure of costs per day per patient. However, this process bears little relation to the types or amounts of nursing care which the patient actually needed or received.

There are several steps which must be completed before the cost of nursing care can be directly attributed to a single patient of group of patients.

All studies stressed the need to (a) accurately and
consistently identify the total nursing care time
required to provide the level of care which the patient
needs, and (b) associate that total nursing care time
to specific patients or groups of patients (Kyle &
Kinder, 1990; Barhyte & Glandon, 1988 Eastaugh, 1987;
Staley & Luciano 1984). Methods of computation vary
among institutions. The key to accurate identification
is consistent use of the methods used to ensure a
certain degree of accuracy.

The first step in associating nursing care
requirements with DRGs is the development and
implementation of a reliable staff allocation method
which will provide for comparability of nursing labor
requirements throughout the facility and across
hospitals (Staley & Luciano, 1984). Nurse staffing
allocation systems are frequently associated with
patient classification systems (PCS). PCSs are
scientifically developed methods which classify and
quantify the amount and level of nursing care required
by patients during their hospitalizations.

Methods of determining the amount and intensity of
nursing care provided to patients were developed and
implemented as early as the 1960s (Reschak, Biordi,
Holm, & Santucci, 1987). The two most frequently used

methods are relative intensity measures (RIMs) and
patient classification systems. The RIMs method
quantifies the time spent in providing patient care by
DRG and assigns relative values to the time spent in
determining costs. The relative values assigned to the
time reflect a relative intensity-of-illness trajectory
for each patient, which correlated with nursing care
delivered (Caterinicchio, 1983). The PCS method
utilizes critical indicators to classify patients into
categories which represent nursing workloads
(requirements). Some PCSs are used to relate the
workload to staffing. Critical indicators are based on
the patient's documented nursing and medical orders
(Giovannetti, 1979).

Well described in the literature, most PCSs were
shown to be valid and reliable within the settings in
which they are employed (Meyer, 1978; Nauert, Leach, &
Watson, 1988). Using a PCS as the standard for
allocating nursing labor enables nurse executives to
determine the relative amount of nursing time each
patient requires on a daily basis. Once the patients
are classified, the total nursing care time required is
tallied for each unit. These totals are then used to
plan staffing for the next 24 hour period. The
historical data may be used to analyze trends and to

plan for future peaks and lulls in patient care requirements, both at the unit and facility level.

Once a proven and reliable resource allocation system, or PCS, has been in use in the facility long enough to develop and document reliability of the instrument, scientific study of the relationships between nursing care requirements and DRGs can begin. The second step in determining the cost of providing nursing care is to associate levels of nursing care with specific groups of patients.

The Workload management System for Nursing (WMSN) combines PCS and nurse staffing methodology in one useful management tool. It is the primary system used to quantify nursing workload in the Department of Defense (DoD) medical treatment facilities (MTFs). The WMSN resulted from the combined research efforts of the U.S. Army and U.S. Navy to objectively quantify nursing workload, based on patient care needs (critical indicators), and determine the appropriate levels of nursing staff required to provide quality nursing care (Lieutenant Colonel D. Norton, USA, personal communication, November 10, 1990).

Reliability and validity for the WMSN was initially demonstrated in Army and Navy MTFs in 1984. Further refinements were completed and a revised

version of the system was implemented in Army and Navy

facilities in 1985. In 1988, the Office of the

Assistant Secretary of Defense (Health Affairs) adopted

the WMSN as the basis for the Joint Service Inpatient

Nursing Standards. Representatives of all services

coordinated developments in automation, research,

management, and education for the WMSN. The Air Force

began using the WMSN in 1989 (Birch & Davis, 1990).

Several studies have been conducted to identify

potential relationships between scientifically applied

nursing resource allocation systems and DRGs (Kyle &

Kinder, 1990; Bost & Lawler, 1989; O'Connor, 1988;

Reschak, Biordi, Holm, & Santucci, 1987; Hancock &

Fuhs, 1984; Staley & Luciano, 1984). Kyle and Kinder

(1990) used a patient classification system (PCS) to

project nursing resource requirements (staffing) to

meet standards of care for patients assigned to a

specific DRG. The results demonstrated that nursing is

only part of the DRG costs and that it is the most

unpredictable. This study also showed that it was

possible to measure the cost of direct nursing care

consumed by patients in a specific DRG.

Bost and Lawler (1989) used a Nursing Intensity

Index (NII) as the basis for determining the amount and

intensity of nursing care required in a North Carolina

hospital. The NII is thought to be a better PCS because it uses (a) the patient as the unit of analysis (rather than the nursing interventions), (b) the nursing process as its fundamental framework, and (c) conceptual nursing frameworks. This study demonstrated statistically significant relationships between NII, LOS, and charges. It also revealed that some DRGs did not reflect homogeneity with respect to nursing intensity levels. This last finding is consistent with assertions that the PPS does not account for patient acuity ranges within individual DRGs.

In an effort determine the feasibility of using DRGs to predict nursing resources for military, Congress directed the Department of Defense to conduct a study of the WMSN patient classification system in use in military MTFs. The study (Birch & Davis, 1990) assessed existing relationships between the WMSN and DRGs with the WMSN data as the dependent variable. The population consisted of 4,291 patients distributed into 114 DRGs at 24 U.S. Army. Ninety-five percent of the cases were from eight of the facilities represented. The findings revealed that nursing care hours varied considerably among the DRGs, but were relatively clustered within each one. One exception was noted: a small group of DRGs appeared to have mutually exclusive

groups of patients (i.e., a bimodal distribution).
Birch & Davis concluded that the model tested produced
realistic estimates of nursing care hours. However,
DRGs with outliers should be individually assessed for
determination of the most precise method of
interpretation (Birch & Davis, 1990).

Purpose Statement

The purpose of the study is to identify the
nursing care requirements for DRGs 138 and 139 at
Wilford Hall USAF Medical Center and analyze the
relationship(s) of those requirements to length of stay
and acuity levels. The results of the analysis will be
compared to the results of the Birch and Davis study
which examined similar relationships identified within
the U.S. Army medical treatment facilities.

Methods and Procedures

Definitions

Comorbidity. A pre-existing condition that will,
because of its presence with a specific diagnosis,
cause an increase in length of stay by at least one day
in approximately 75 percent of the cases. (Lorenz &
Jones, 1989)

Complication. A condition that arises during the hospital stay that prolongs the length of stay at least one day in approximately 75 percent of the cases. (Lorenz & Jones, 1989)

Diagnosis-Related Group (DRG). A system of classifying diseases and disorders of the body into major diagnostic categories, (e.g., diseases and disorders of the respiratory system). Each category contains a surgical and a medical division. The primary determinant of the DRG is the principal diagnosis, but proper assignment of the DRG also includes consideration of all diagnoses, procedures, conditions, complications, co-morbidities, and signs and symptoms which existed during the hospitalization. (Lorenz & Jones, 1989)

DRG 138. Cardiac arrhythmias and conduction disorders. Age over 69 years and/or the presence of complications or comorbidities (Lorenz & Jones, 1989).

DRG 139. Cardiac arrhythmias and conduction disorders. Age under 70 years and no complications or comorbidities (Lorenz & Jones, 1989).

Length of Stay (LOS). The length of the hospitalization, from the day of admission to the day of discharge. Some facilities count the day of admission but do not count the day of discharge unless

it is past a certain time of the day when the patient

departs. Other facilities do not count the day of

admission but count the day of discharge.

Patient Classification System (PCS). Patient

classification is generally defined as the grouping of

patients according to some observable or inferred

characteristics (e.g., blood type, medical specialty,

and diagnosis). In nursing, a patient classification

system is a method which identifies and groups patients

into care groups or categories, and to quantifies the

categories as a measure of the nursing effort required.

The basis of the PCS is that variations in nursing time

are directly related to patient care needs

(Giovannetti, 1979).

Total Nursing Care Hours (TNCH). TNCH reflects

the total hours of nursing care (direct and indirect)

for the entire patient stay and is determined by adding

the daily nursing care hours for each day of the

patient's stay.

Study Setting

Located in Southwest San Antonio, Texas, Wilford

Hall USAF Medical Center (WHMC) is the largest hospital

in the U.S. Air Force. WHMC is a tertiary care,

referral center for 125 Air Force and other within the

military healthcare system. Locally, it serves a
population of 70,000, a portion of which may also seek
care from Brooke Army Medical Center which is located
in Northeast San Antonio. These two facilities also
serve a portion of the local civilian population for
provision of emergency care.

WHMC is staffed for approximately 600 beds. Its
daily census averages approximately 500. The facility
has 32 nursing units, 10 of which provide intensive
care for acutely ill or injured patients.

In fiscal year (FY) 1989, WHMC discharged 137
patients whose cases were classified as DRG 138 and 144
patients whose cases were classified as DRG 139.
According to Retrospective Case Mix Analysis System
(RCMAS) data for WHMC discharges during FY 1989, these
two DRGs ranked as number 41 and number 37,
respectively. Total discharges for the facility were
reported as 26,025. These two DRGs accounted for only
one percent of the facility discharges.

Instrument

The WMSN has been in use in WHMC for approximately
one year. The implementation of the PCS was carried
out in an organized and methodical manner. Appropriate
operating instructions were developed prior to

implementation and distributed to all necessary areas
of the facility (Major C. Bowe, USAF, personal
communication, April 10, 1990).

General guidelines and usage instructions for the
WMSN are contained in the <u>Nursing Service Operating
Instruction (NSOI) 168-1: Workload Management System
for Nurses</u> (Division of Nursing, 1990). Computation of
the acuity level is accomplished daily, between 1200
and 1400 hours, using specially prepared worksheets.
The final computation is then transferred to the
nursing service information system for use at
management level. The acuity level is also to be
recorded in the medical record on the vital signs
record. The NSOI states that the worksheets are not a
part of the completed medical record after discharge
but does not specify what is to be done with them
(worksheets) once they are completed. Discussions with
unit managers reveal that they are routinely kept on
the unit from which the patient is discharged.

Population

The population studied includes all patients
discharged from WHMC 1 January 1991 through 30 June
1991. The list of patients who would be included was
developed from the Automated Quality of Care Evaluation

Support System (AQCESS) based upon the primary
diagnoses entereo into the syst?: ;/ter the full
medical record review was com'.e'e:. Primary diagnoses
(Appendix A) included in the st./7/ are specified in The
International Classification of Pi=e-ises, 9th revision,
Clinical Modification (ICD-9-CM .Jones, Uttenreither,
Meisch, & Arron (Eds), 1980).

Study Design

This study is designed primarily as a replication
of the Birch and Davis study in an effort to determine
if WHMC patients who fall into DRGs 138 and 139 exhibit
similar relational characteristics. Data gathered will
be the same in this study as the Birch and Davis study
but analysis will be completed at the diagnosis level
as well as the aggregate DRG level.

The first phase of the study is determining cases
to be included in the study. Preliminary data
collection from AQCESS reveals 73 patients with the
specified primary diagnoses were discharged between 1
January 1991 and 31 Mar 1991. Using extrapolation
techniques, the potential population for the five
month, 100 percent review study is approximately 120
patients. Each case will be processed through a DRG
grouper and eliminated if not found to be classified as

either DRG 138 or 139. Data will be gathered for each case and cases with the same primary diagnosis wi.1 be grouped together.

The second phase of the study is the statistical evalua' .on of the data collected. Cases will be aggregated by primary diagnosis for initial ana' ,sis and then grouped according to DRG for final analysis. Using the primary diagnosis as the aggregate may reveal some differentiating characteristics which could support the theory that some DRGs do not represent homogenous groupings and that further refinement of the DRGs is necessary.

Data Collection

Nursing care requirements will be associated with DRG 138 and 139 through collection of diagnosis specific data and patient specific data.

Diagnosis specific data. A special report from AQCESS provided a list of cases with the following data about each: (a) the primary discharge diagnosis (by ICD-9-CM code), (b) the register number, (c) the patient's name, (d) the patient's age, (e) the admission date, (f) the discharge date, and (g) the length of stay.

Patient specific data.   Patient specific data
to be retrieved from the medical record includes (a)
the register number, (b) the name, (c) the primary
diagnosis, and (d) the assigned acuity level for each
day of the hospital stay as computed according to the
WMSN guidelines (Appendix B).

Verification of the location of the acuity level
reveals that nursing personnel do not record the acuity
level in the medical record in the prescribed manner
(NSOI 168-1).   Therefore, since the nursing service
information system and AQCESS are not compatible
programs, it is necessary to research the worksheets
retained on the nursing units after the patient is
discharged.   Because the computed acuity level is not
documented in the medical record, the patient's name
and register number are required to ensure proper
association of the medical record and the worksheets
from which acuity data will be retrieved.   Appropriate
precautions will be taken to ensure the privacy of each
patient is maintained.   Data will be organized
according to register number only to provide an
appropriate audit trail; all other identification data
will be destroyed after the study is completed.

Statistical Analysis

Statistical analysis will include determination of the mean, median, standard deviation, and coefficient of variation for each of the diagnoses within the two DRGs being studied. Cases will then be aggregated under the appropriate DRGs and the analysis will be reaccomplished. Discussion will include the effects of inclusion or exclusion of outliers within the case population for each diagnosis and each DRG.

Expected Findings

Because each record will be subjected to the DRG group process, inclusion of cases which are not true DRG 138s or 139s should be avoided. Therefore, it is not expected to obtain similar results as the Birch and Davis study. Analysis at the diagnosis level should reveal any variances in the nursing care hour requirements. If this study reveals results similar to that of the Birch and Davis study two assumptions should be possible: (a) the cases in both studies were correctly grouped, and (b) variances in nursing care hour requirements do exist within these two DRGs.

Utility of Results

The ability to follow trends in patient care needs and nursing personnel requirements for each DRG will allow healthcare executives to realistically assess the current facility case mix and determine future capabilities.

Completion of the study will also delineate problem areas with future utilization of data computed at the patient level which is poorly organized and stored. The present information management systems do not allow for easy retrieval or manipulation of data.

Close examination of the nursing care requirements at the diagnosis level will reveal problem areas within specific DRGs regarding computation of resource use and reimbursement.

Consistent correlations between nursing resource consumption and DRGs will give nursing and financial managers baseline data with which to begin identification of the costs of providing nursing care. It will also allow development of methods to assess proper staffing mix to meet patient needs.

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Appendix A

DRG 138 and 139 Diagnosis List

DRG 138:   Cardiac Arrhythmia and Conduction

Disorders. Age over 69 years and/or the presence of

complications or comorbidities.

426 Conduction Disorders

   426.0 Atrioventricular block, complete

   426.1 Atrioventricular block, other and

        unspecified

        426.10 Atrioventricular block, specified

        426.11 First degree atrioventricular block

        426.12 Mobitz (type) II atrioventricular

              block

        426.13 Other second degree atrioventricular

              block

   426.2 Left bundle branch hemiblock

   426.3 Other left bundle branch block

   426.4 Right bundle branch block

   426.5 Bundle branch block, other and unspecified

        426.50 Bundle branch block, unspecified

        426.51 Right bundle branch block and left

              posterior fascicular block

        426.52 Right bundle branch block and left

              anterior fascicular block

        426.53 Other bilateral bundle branch block

426.54 Trifascicular block

426.6 Other heart block

426.7 Anomalous atrioventricular excitation

426.8 Other specified conduction disorders

426.81 Lown-Ganong-Levine syndrome

426.89 Other

526.9 Conduction disorde.-, unspecified

427 Cardiac dysrhythmias

427.0 Paroxysmal supraventricular tachycardia

427.1 Paroxysmal ventricular tachycardia

427.2 Paroxysmal tachycardia, unspecified

427.3 Atrial fibrillation and flutter

427.31 Atrial fibrillation

427.32 Atrial flutter

427.4 Ventricular fibrillation and flutter

427.41 Ventricular fibrillation

427.42 Ventricular flutter

427.5 Cardiac arrest

427.6 Premature beats

427.60 Premature beats, unspecified

427.61 Supraventricular premature beats

427.69 Other

427.8 Other specified cardiac dysrhythmias

427.81 Sinoatrial node dysfunction

427.89 Other

427.9 Cardiac dysrhythmia, unspecified

428 Heart failure

428.0 Congestive heart failure

428.1 Left heart failure

746 Other congenital anomalies of the heart

746.86 Congenital heart block

785 Symptoms involving cardiovascular system

785.0 Tachycardia, unspecified

785.1 Palpitations

996 Complications peculiar to certain specified

procedures

996.0 Mechanical complications of cardiac device,

implant, and graft

996.01 Due to cardiac pacemaker (electrode)

DRG 139: Cardiac Arrhythmia and Conduction

Disorders. Age less than 70, without complications or

comorbidities.

DRG 139 uses the same diagnoses and ICD-9-CM codes

as those listed for DRG 138.

Note. From The international classification of

diseases, 9th revision, clinical modification (ICD-9-

CM) (2nd ed) by Jones, M. K.; Uttenreither, M.; Meisch,

M.; & Arron, W.S. (Eds), 1980 (with all current errata

as of October, 1990), Washington, DC: St. Anthony

Hospital Publications, Inc.

Appendix B

Computation of Total Nursing Care Hours

Total nursing care hours are derived directly from summing daily patient acuity. To determine nursing care hours for a particular patient day, a patient category is selected by matching the daily points (calculated by completing the acuity worksheet) with the appropriate point range given below.

Category	Point Range		
I	1	to	12
II	13	to	31
III	32	to	63
IV	64	to	95
V	96	to	145
VI	146	to	262

The category is also used to determine the direct care time, expressed in hours.

Category	Direct Care Hours Per Day
I	0.88
II	2.75
III	6.00
IV	10.00
V	15.13
VI	25.50

The category is then matched with one of six ward types to determine the indirect care factor.

Unit Type	Indirect Care Factor
Medical/Surgical	1.761
ICU/CCU/NICU	1.662
Obstetrics	1.778
Psychiatric	1.689
Newborn	1.630
Pediatrics	1.727

The direct care hours and indirect care factors are multiplied together to determine the nursing care hours required to satisfy a particular patient's needs for that patient day.

Note. From Reference manual: Workload management system for nursing by the Joint Manpower Office, Office of the Assistant Secretary of Defense (Health Affairs) 1989, Rockville, MD: U.S. Government Printing Office.